



***Science / Electronics***

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## **QBT Digital Block Heaters**

### **Users Manual**

## User Manual for QBT Digital Block Heaters

<b>Product</b>	<b>Description</b>
QBT1	Digital Block Heater - holds 1 block
QBT2	Digital Block Heater - holds 2 blocks
QBT4	Digital Block Heater - holds 4 blocks

### **Covers**

QLS	Polycarbonate cover for QBT1 and QBT2
QLL	Polycarbonate cover for QBT4

### **Blocks**

QB-xx	Machined aluminum blocks
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## 1. SAFETY

- ◆ **Always obey the following safety precautions:**



CAUTION: Read this documentation **fully** before use and pay particular attention to sections containing this symbol:

- ◆ CAUTION: Some surfaces can become HOT during high temperature operation.
- ◆ Use only as specified by the operating instructions, or the intrinsic protection may be impaired.
- ◆ After transport or storage in humid conditions, dry out the unit before connecting it to the supply voltage. During drying out the intrinsic protection may be impaired.
- ◆ Only connect to a power supply with a voltage corresponding to that on the serial number label.
- ◆ Connect the control unit only to a power supply which provides a safety ground terminal. Connecting to an ungrounded power supply is potentially dangerous.



Before moving disconnect the power supply at the power supply socket. Do NOT remove the IEC connector from the rear of the unit.

- ◆ Ensure that the unit is positioned such that the power switch is easily accessible during use.
- ◆ The ventilation slots must not be blocked or restricted.
- ◆ To reduce the risk of eye injury during high temperature operation, use safety goggles.
- ◆ Do not touch surfaces which become hot during high temperature operation.



Do not check the temperature by touch, use the temperature display or a thermometer.

- ◆ If the alarm lamp is illuminated DO NOT TOUCH IT - it will be very HOT. Do not place hot blocks on a flammable surface. Allow unit to cool down before moving.
- ◆ Ensure that the operating temperature is less than the maximum operating temperature of your sample material.

- ◆ Set the adjustable overtemperature cut-out after setting or changing the set temperature, and reset it at monthly intervals to check that the cut-out is operating correctly.
- ◆ Do not touch the blocks within the unit itself, or after removal, they may be hot. Always remove blocks with the extraction tool supplied.
- ◆ If liquid is spilled inside the unit, disconnect it from the power supply and have it checked by a technician.
- ◆ It is the user's responsibility to carry out any appropriate decontamination if hazardous material is spilled on or inside the equipment.

## **2. GETTING STARTED**

### **2.1 Unpacking**

Remove the packing materials carefully, and retain for future shipment or storage of the unit. Packs should contain:

- Block heater
- Power line cord
- Block extraction tool
- Operating instructions

Blocks are supplied separately in their own pack.

### **2.2 Assembly**

Fit the power line cord into the IEC power socket on the underside of the unit (see Figure 1). Then line cord should run toward the back of the unit.

Insert the blocks using the extraction tool provided (see Figure 2).

Take care not to drop the blocks; if they are damaged, heat transfer may be affected. Use the maximum number of blocks possible.

Place block extraction tool in the locator hole for future use (see Figure 2).

Before switching on for the first time, turn the black set overtemperature knob fully clockwise and press it.

Switch on power to the unit.

### 3. OPERATION

#### 3.1 Controls and indicator lamps (see Figure 3)

The temperature display normally shows the block temperature in °C. When the **gray display set temperature °C** button is pressed the set temperature is shown.

The **set temperature °C** (blue knob) sets the required operating temperature.

The **display set temperature °C** (gray button) shows the set temperature when pressed.

The **heater** lamp (orange) indicates when the heater is on. The heater lamp is on continuously while the blocks are heating up. As the required temperature is approached, it starts to flash. When the unit is controlling at the set temperature, the heater lamp flashes intermittently.

The **alarm** lamp (red) illuminates when the overtemperature cut-out has operated.

**Set overtemperature push to reset** (black knob) sets the overtemperature cut-out. The cut-out operates if the block temperature rises above this temperature. When it has operated, the red alarm lamp illuminates and the heater is switched off. The block temperature continues to be displayed to warn of possible high temperatures.

#### 3.2 Setting the temperature

The display normally shows the block temperature. To show the set temperature at any time, press the gray **display set °C** button. To set the required operating temperature, push the gray **display set °C** button, while turning the blue **set temperature °C** knob until the required operating temperature is indicated on the display.

### 3.3 Setting the overtemperature cut-out

To protect both the unit and your samples, the overtemperature cut-out should be set each time the required operating temperature is changed. Using a screwdriver, turn the black **set overtemperature** knob fully clockwise and press to reset. The cut-out is now set at its maximum. Allow the block heater to stabilize at the required operating temperature. Turn the black control knob slowly counter-clockwise using a screwdriver until the **red alarm** light comes on. Press the control and gently turn counter-clockwise (while still pressing) until the alarm light goes out. Turn the control counter-clockwise three quarters of the way back towards the point where the alarm lamp came on. The overtemperature cut-out is now set approximately 10 °C above the required operating temperature.

Note: If the required operating temperature is above 140 °C turn the black knob fully clockwise.

### 3.4 Resetting the overtemperature cut-out

If the overtemperature cut-out has operated, the block heater needs to cool to just below the set temperature before the cut-out can be reset.

### 3.5 Measuring temperature

The block temperature may be checked by placing a temperature probe (maximum diameter 3.5 mm) fully into the block extraction hole. An accurate calibrated digital thermometer should be used. It is not recommended to make measurements directly in the test tube. The probe size can cause errors.

## 4. ACCESSORIES

### 4.1 Individual Blocks

Individual blocks are available for test tubes, universal bottles, and microcentrifuge tubes.

QB-0	plain block
QB-10	for 10 mm test tubes
QB-12	for 12 mm test tubes
QB-16	for 16 mm test tubes
QB-18	for 18 mm test tubes
QB-24	for 24 mm test tubes, universal bottles
QB-E0	for 0.5 ml microcentrifuge tubes
QB-EL	for 1.5 ml microcentrifuge tubes

Any of the above blocks can be used with each of the block heaters. The QBT2 and QBT4 can be used with any combination of these blocks. When dissimilar blocks are used the uniformity specification across blocks at 37 °C typically rises to  $\pm 0.4$  °C.

### 4.2 Safety Covers (see Figure 4 for installation instructions)

QLS	for QBT1 and QBT2
QLL	for QBT4

The cover restricts the use of test tubes to those less than 125 mm in length. Tough, clear polycarbonate covers maintain visibility while preventing anyone from accidentally touching a hot block. They also protect against hot liquids or expensive accidents and are particularly recommended for use during high temperature operation.

The cover pack should contain:

- Cover
- Two M3 screws 12 mm long
- Two lock washers
- Four plain washers
- Two spacers



## 5. FAULT DIAGNOSIS

Symptom	Possible Cause	Action Required
Unit does not operate	Unit not switched on	Switch On
	Unit not plugged into power supply	Plug in, switch on
	Fuse blown in the unit	Check and replace
	Electrical power supply failure	Check that other electrical appliances on the same circuit are working
Alarm light on	Overtemperature cut-out has operated	Reset cut-out and check its setting as described in 3.3 and 3.4 If cut-out operates again or cannot be reset, have the unit checked by a technician.
Temperature does not rise when expected	Set temperature is lower than block temperature	Check set temperature
	Set temperature is too close to ambient	Raise set temperature
	Temperature control circuit fault	Have unit checked by technician
Temperature continues to rise when not expected	Set temperature is higher than block temperature	Check set temperature
	Temperature control circuit fault	Have unit checked by technician

## 6. TECHNICAL SPECIFICATIONS

This equipment is for indoor use and will meet its performance figures within the ambient temperature range of 10 °C to 35 °C, with maximum relative humidity of 80%.

	QBT1	QBT2	QBT4
Temperature range	Ambient + 5 °C to 150 °C		
Setting range	15 °C to 150 °C		
Stability @37 °C	± 0.1 °C		
Temperature display resolution	1 °C		
Overtemperature protection	Adjustable, resettable overtemperature cut-out		
Supply voltage range	110-120VAC, 50/60Hz		
Power Rating	150 W	300 W	600 W
Uniformity @ 37 °C			
Within the block	± 0.1 °C		
Across similar blocks	± 0.2 °C		
Across dissimilar blocks	± 0.4 °C		
Heat-up rate (ambient to max)	40 minutes		
Dimensions l/w/h (mm)	180/205/122	230/205/122	330/205/122

## 7. MAINTENANCE AND SERVICE

All Science/Electronics laboratory products are designed to comply with IEC1010-1 and can be flash tested. Some are fitted with radio frequency interference suppressors - Therefore it is recommended that only a d.c.. test is performed.

The overtemperature cut-out should be checked periodically by turning the black set overtemperature knob counter-clockwise until the alarm lamp comes on. The cut-out should then be reset and set-up (see 3.4 and 3.3). If the alarm lamp fails to light with the knob turned fully counter-clockwise the block heater should be checked by a technician.

## **7.1 Cleaning**

The case can be cleaned with a damp cloth after disconnection. Do not use solvents.

Before using any cleaning or decontamination method except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.

## **7.2 Replacement of fuses**

Remove the blocks.

Disconnect the unit from the power supply socket.

Remove the IEC power plug from the socket in the base.

Press down the drawer catch (see Figure 1).

Pull out the fuse drawer, check and replace with the correct fuses if necessary. The fuses should be 1.25 x 0.25 inch quick acting rated:

QBT1:	250V - 3AF
QBT2	250V - 5AF
QBT4	250V - 10AF

Push back the drawer and replace the IEC plug.

## **8. WARRANTY**

When used in laboratory conditions and according to this user manual, this equipment is warranted for THREE YEARS against faulty materials or workmanship.

## **9. SERVICE**

It is necessary that a Returned Materials Authorization (RMA) number and form be obtained before return of any Science/Electronics product for any reason. Contact us for more information. Please be sure to mark the outside of the returned goods package with this RMA number to ensure prompt handling.

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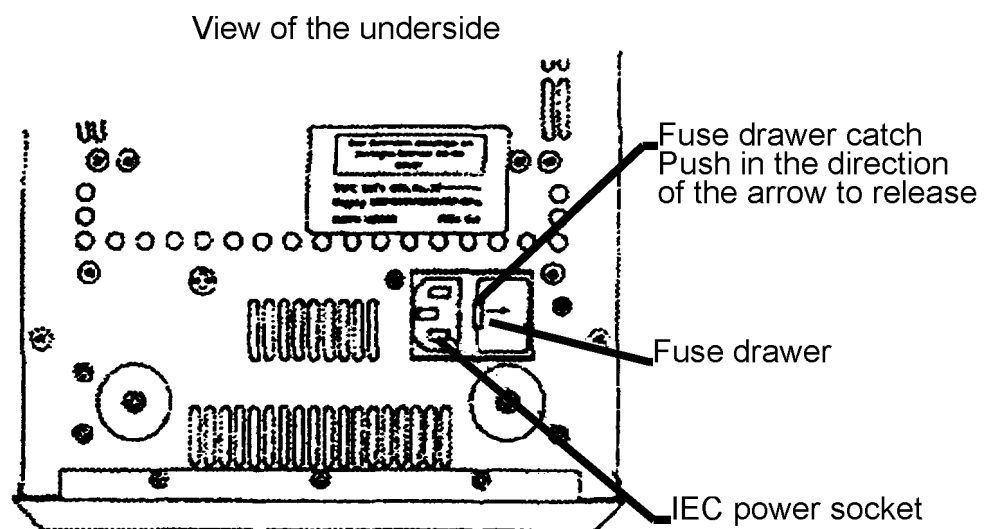


Figure 1

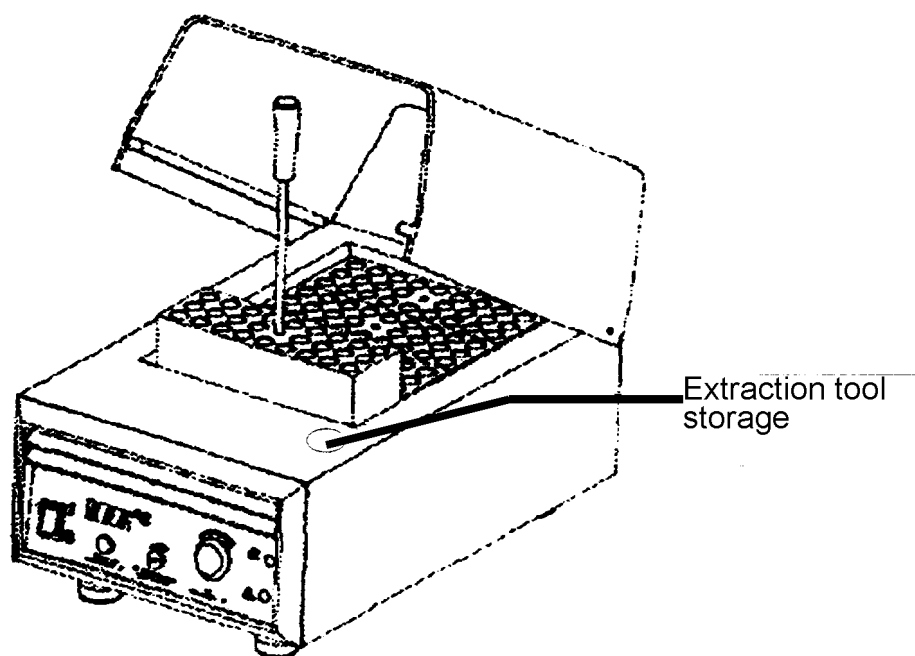


Figure 2

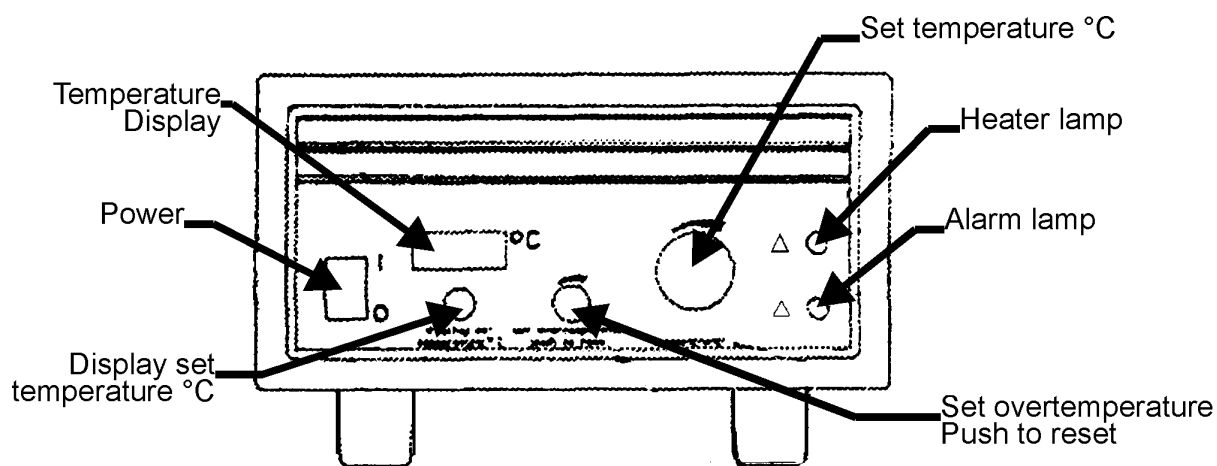


Figure 3

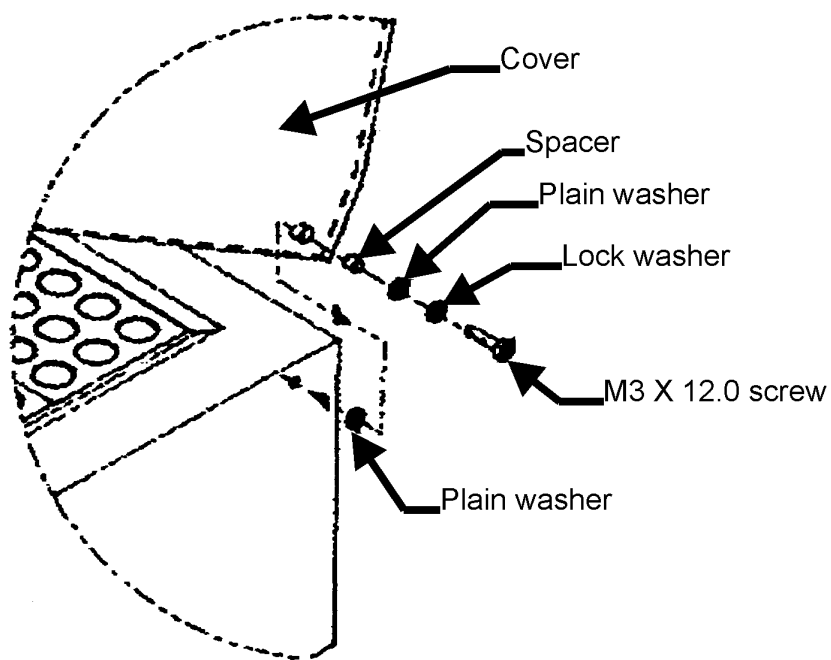


Figure 4